

# Amey Mahesh Kulkarni

[amey@ieee.org](mailto:amey@ieee.org)

<http://www.csee.umbc.edu/~ameyk1/>

<https://www.linkedin.com/in/ameyk>

(443)-310-7323

## Research Areas

DSP Algorithms, Deep Learning Architectures, Machine Learning, LiDAR 3D-point cloud data processing

## Professional Experience

### FPGA Engineer

May2017- Present

- Velodyne LiDAR, San Jose, California
- DSP and Computer Vision Team

### Senior Embedded Systems Engineer

February2017-May2017

- Autel Robotics, San Ramon, California
- Visual Tracking Team

### Research Associate, Advisor: Professor Farinaz Koushanfar

August2016-February2017

- University of California, San Diego, Electrical and Computer Engineering,
- Adaptive Computing and Embedded Systems (ACSE) Lab

### Research Assistant, Advisor: Professor Tinoosh Mohsenin

August2013-August2016

- University of Maryland, Baltimore County, Computer Science and Electrical Engineering,
- Energy Efficient High Performance Computing (EEHPC) Lab

### Summer Intern, Advisor: Youngok Pino

May2014-August2014

- USC Information Science Institute (USC-ISI), Arlington Virginia
- Reconfigurable Computing Group

### Teaching Assistant

August2012-May2014

- University of Maryland, Baltimore County, Computer Science and Electrical Engineering

### VLSI Design and Verification Engineer

January2012-June2012

- Silicon Interfaces Pvt. Ltd., Mumbai, India

### VLSI Engineer

June2010-September2011

- Three D Microsystem Pvt. Ltd., Mumbai, India

## Education

### University of Maryland, Baltimore County (Baltimore, MD, USA)

August2012-February2017

PhD. in Computer Engineering

- Thesis: Secured Embedded Many-Core Accelerator for Big Data Processing
- Advisor: Professor Tinoosh Mohsenin

### Vellore Institute of Technology (Vellore, TN, India)

June2008-May2010

M.Tech in VLSI Design

- Thesis: Dynamic Energy Efficient Memory Controller for a H.264/AVC Application
- Advisor: Professor V. Arunachalam

### University of Mumbai (Mumbai, MH, India)

July2004-May2007

B.E. (Bachelor of Engineering) in Electronics and Telecommunication

## Publications

### Journals

1. **Amey Kulkarni**, Youngok Pino, Matthew French, and Tinoosh Mohsenin, "Real-Time Anomaly Detection Framework for Many-Core Router through Machine Learning Techniques", *ACM Journal on Emerging Technologies in Computing Systems*, Vol. 13, No. 1, Article 10, Publication date: March 2016
2. **Amey Kulkarni**, Tinoosh Mohsenin, "Low Overhead Architectures for OMP Compressive Sensing Reconstruction Algorithm," in *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol.64, no.6, pp.1468-1480, June 2017

3. **Amey Kulkarni**, Colin Shea, Tahmid Abtahi, and Tinoosh Mohsenin, "Low Overhead CS-based Heterogeneous Framework for Big Data Acceleration", *ACM Transaction on Embedded Computing Systems* (Accepted)
4. Tahmid Abtahi, Colin Shea, **Amey Kulkarni**, and Tinoosh Mohsenin, "Accelerating Convolutional Neural Network with FFT on Embedded Hardware", in *IEEE Transactions on Circuits and Systems I (ISCAS 2017, Invited, Under Review)*

## Conferences

5. **Amey Kulkarni**, Colin Shea, Houman Homayoun, and Tinoosh Mohsenin, "LESS: Big Data Sketching and Encryption on Low Power Platform", 2017 Design, Automation & Test in Europe Conference & Exhibition (DATE), Switzerland, 2017.
6. Adwaya Kulkarni, Tahmid Abtahi, Colin Shea, **Amey Kulkarni**, and Tinoosh Mohsenin, "PACENet: Energy Efficient Acceleration for Convolutional Network on Embedded Platform", in *Circuits and Systems (ISCAS), 2017 IEEE International Symposium on*, 28-31 May 2017. **(Invited Paper)**
7. Tahmid Abtahi, Colin Shea, **Amey Kulkarni**, and Tinoosh Mohsenin, "Accelerating Convolutional Neural Network with FFT on Domain Specific Many-Core", in *Circuits and Systems (ISCAS), 2017 IEEE International Symposium on*, 28-31 May 2017.
8. **Amey Kulkarni**, Youngok Pino, and Tinoosh Mohsenin, "Adaptive Real-time Trojan Detection Framework through Machine Learning", *2016 IEEE International Symposium on Hardware Oriented Security and Trust (HOST)*, Washington, DC, 2016.
9. **Amey Kulkarni**, Ali Jafari, Chris Sagedy and Tinoosh Mohsenin, "Sketching-based High-Performance Biomedical Big Data Processing Accelerator", in *Circuits and Systems (ISCAS), 2016 IEEE International Symposium on*, 24-27 May 2016. **(Invited Paper)**
10. **Amey Kulkarni**, Youngok Pino, and Tinoosh Mohsenin, "Supervised Post-Deployment Trojan Detection in Integrated Circuits", in *17th International Symposium on Quality Electronic Design (ISQED), 2016*.
11. **Amey Kulkarni**, Ali Jafari, Colin Shea, and Tinoosh Mohsenin, "CS-based Secured Big Data Processing on FPGA", *24th Annual IEEE Symposium on Field-Programmable Custom Computing Machines, 2016. FCCM'16.*, Washington DC.
12. **Amey Kulkarni**, Tahmid Abtahi, Emily Smith, and Tinoosh Mohsenin, "Low Energy Sketching Engines on Many-Core Platform for Big Data Acceleration", in *Proceedings of the 26th edition of the great lakes symposium on VLSI (GLSVLSI '16)*. ACM, New York, NY, USA.
13. Adam Page, **Amey Kulkarni**, and Tinoosh Mohsenin, "Utilizing deep neural nets for an embedded ECG-based biometric authentication system", in *Biomedical Circuits and Systems Conference (BioCAS), 2015 IEEE*, vol., no., pp.1-4, 22-24 Oct. 2015.
14. **Amey Kulkarni**, Tinoosh Mohsenin, "Accelerating compressive sensing reconstruction OMP algorithm with CPU, GPU, FPGA and domain specific many-core", in *Circuits and Systems (ISCAS), 2015 IEEE International Symposium on*, vol., no., pp.970-973, 24-27 May 2015.
15. Mohammad Khavari Tavana, **Amey Kulkarni**, Abbas Rahimi, Tinoosh Mohsenin, and Houman Homayoun, "Energy-efficient mapping of biomedical applications on domain-specific accelerator under process variation", In *Proceedings of the 2014 international symposium on Low power electronics and design (ISLPED '14)*. ACM, New York, NY, USA, 275-278.
16. Tawana Khawari, **Amey Kulkarni**, Abbas Rahimi, Tinoosh Mohsenin and Houman Homayoun "Energy-Efficient Mapping of Real-time Tasks in Many-Core Accelerator Under Process Variation", *ACM/IEEE 51st Design Automation Conference, DAC 2014 (Work-In-Progress)*
17. **Amey Kulkarni**, Houman Homayoun, and Tinoosh Mohsenin, "A parallel and reconfigurable architecture for efficient OMP compressive sensing reconstruction", in *Proceedings of the 24th edition of the great lakes symposium on VLSI (GLSVLSI '14)*. ACM, New York, NY, USA, 299-304.
18. **Amey Kulkarni** and V.Arunachalam, "FPGA Implementation of Dynamic Energy Efficient Memory Controller for a H.264/AVC Application", *International Journal of Computer Application (IJCA)*, April'2011 Edition.

19. **Amey Kulkarni** and V.Arunachalam, "FPGA Implementation & Comparison of Current Trends in Memory Scheduler for Multimedia Application", *International Conference and Workshop on Emerging Trends and Technology (ICWET)*, February 2011.
20. **Amey Kulkarni** and V.Arunachalam, "FPGA Implementation Of Dynamic Memory Access Scheduler", *International Conference on Communication, Computers and Devices (ICCCD) 2010*, December 2010.

### Invited Talks

- Xilinx Inc. (DSP Group), San Jose, CA  
"Towards a Secured Cognitive Internet of Things Processing Platform", October 2016
- HGST San Jose research center, San Jose, CA  
"Secured Embedded Many-Core Accelerator for Big Data Processing", March 2016.
- NVIDIA, Santa Clara, CA  
"Secured Embedded Many-Core Accelerator for Big Data Processing", March 2016.
- USC – Information Science Institute, Arlington, VA  
"Real-time Security for Many-Core through Machine Learning Approach", May 2014.

### Technical Expertise

**Languages Known** : Verilog, SystemVerilog, PERL, Python, UNIX, Matlab, MPI, Cuda, C++ and TensorFlow

**Tools familiar with** : Cadence RTL Compiler, Encounter, NCSim and Virtuoso, Synopsys Design Compiler, Mentor Graphics ModelSim, Altera Quartus, Xilinx ISE tools, Vivado, NVIDIA Visual Profiler

**Platforms** : Xilinx FPGA Zynq, Virtex, and Spartan, Nvidia TK1 and TX1, Movidius

### Professional Leadership and Services

- **Reviewed for:**
  - IEEE Mid-West Symposium on Circuits and Systems (MWCAS2017)
  - Elsevier, Integration the VLSI Journal
  - IEEE Transactions on Very Large Scale Integration (TVLSI)
  - IEEE International Symposium on Circuits and Systems (ISCAS2014, ISCAS2017)
  - IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM2015)
  - ACM/IEEE Design Automation Conference (DAC2016)

### Awards

- PhD Dissertation Fellowship, University of Maryland Baltimore County (August 2016-December 2016)
- Travel Grant award, IEEE Hardware Oriented Security and Trust (HOST) Conference Committee, May 2016
- Travel Grant award, ACM Great Lake Symposium on VLSI (GLSVLSI) Conference Committee, May 2016
- Travel Grant award, Chair of Computer Science and Electrical Engineering Department, University of Maryland Baltimore County, March 2016
- Graduate Student Travel Award, University of Maryland Baltimore County, May 2014
- Best paper award nominee, International Conference and Workshop on Emerging Trends and Technology (ICWET), Mumbai, India, May 2011